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UNDERGROUND
ENGINEERING &
ENVIRONMENTAL
SOLUTIONS

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HALEY & ALDRICH

17 October 2001
File No. 27960-001

Mr. Brian Mossman
Boeing Realty Corporation
3855 Lakewood Blvd.
Building 1A MC D001-0097
Long Beach, CA 90846

Subject: **Interim Action Soil Vapor Extraction Workplan**
Former Buildings 1/36
Former Boeing C-6 Facility
Los Angeles, California

This Interim Action Soil Vapor Extraction (SVE) Workplan has been prepared for the Building 1/36 area of Parcel C, at the former Boeing C-6 Facility (subject property), in Los Angeles, California.

The focus of this SVE Interim Action is to reduce the mass of volatile organic compounds (VOCs) in soil in the vicinity of former Buildings 1/36 at depths greater than 12 feet below ground surface (bgs). Impacted soils shallower than 12 feet were remediated by excavation. Subsurface soils in this area primarily contain toluene and the chlorinated solvent volatile organic compounds (VOCs) trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), 1,1,1-trichloroethane (1,1,1-TCA), and 2-Butanone (MEK). In 1991, four underground bulk storage tanks that formerly contained degreasing solvents (15T through 18T) were removed from the area south of Building 36 and north of Building 1. SVE pilot testing has been performed in this area and has demonstrated SVE to be effective at removing the VOCs present. This SVE Interim Action Workplan includes a brief discussion of the site background, assessment, pilot test results, the proposed SVE system elements, construction plans, and operation plans.

bldg1-33

Boeing Realty Corporation
3760 Kilroy Airport Way, Suite 500
Long Beach, CA 90806
Telephone: 562-627-4900
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19 October 2001
C6-BRC-T-01-023

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

BOEING

Attention: John Geroch

Subject: **INTERIM ACTION SOIL VAPOR EXTRACTION WORKPLAN, FORMER BUILDINGS 1/36 FOR BOEING REALTY CORPORATION, FORMER C-6 FACILITY, 19503 SOUTH NORMANDIE AVENUE, LOS ANGELES, CA**

Dear Mr. Geroch:

Please find enclosed for your review, a copy of the subject document prepared by Haley & Aldrich for Boeing Realty Corporation.

If you have any questions concerning this document, please contact the undersigned at 562-593-8623.

Sincerely,

Stephanie Sibbett
Boeing Realty Corporation

Cc: Mario Stavale, Boeing Realty Corporation

enclosure

1.0 BACKGROUND

1. SITE LOCATION AND DESCRIPTION

The subject property comprises approximately 170 acres at 19503 South Normandie Avenue in Los Angeles, California (Figure 1). The property is bordered on the north by West 190th Street; on the east by railroad tracks and South Normandie Avenue; on the south by Montrose Chemical Company and residential properties; and on the west by Western Avenue, Capitol Metals, and International Light Metals (ILM).

In 1952, the Douglas Aircraft Company (DAC) used the facility to manufacture aircraft and aircraft components until approximately 1992. DAC used the subject parcel for storage and warehousing until 1996.

Aboveground and underground structures have been reportedly removed from the site. The site is currently being graded for redevelopment, which is scheduled to begin in the second half of 2001.

1.2 HYDROGEOLOGY/GEOLOGY

The hydrogeologic units relevant to this scope of work are comprised of Holocene and Pleistocene-age alluvium deposits. The upper portions of the site/area geology are composed of the Bellflower Aquiclude (ground surface to approximately 140 feet bgs) consisting of clays and silts, and flood plain deposits composed of silt and sand grading into thinner beds with minor amounts of clay. The upper 30 to 35 feet of the vadose zone is finer grained than the lower 25 to 30 feet. The Gage Aquifer (approximately 150 to 180 feet bgs) underlies the Bellflower Aquiclude (Montgomery Watson, 1994).

At the site, groundwater occurs at approximately 60 to 70 feet bgs in a semi-perched aquifer flowing south-southeast at an approximate hydraulic gradient of 0.0007 feet per foot (ft/ft) to 0.0027 ft/ft (Kennedy/Jenks 2000b).

2.0 INVESTIGATION RESULTS - SUBJECT AREA

The site has undergone numerous phases of site characterization to define the vertical and lateral extent of VOCs in the soil and groundwater in the vicinity of former Buildings 1/36. The area targeted for this interim action includes VOC-impacted soils from the ground surface to approximately 60 feet bgs. These soils contain TCE concentrations of up to 97,000 micrograms per kilogram (μg/kg), 1,1,1-TCA concentrations up to 5,200,000 μg/kg, and toluene concentrations up to 3,700,000 μg/kg beneath the former basement near the northeast corner of Building 1 and the southeast corner of Building 36

2.1 PILOT TESTING

2.1.1 Initial Pilot Test

In August 1993, Montgomery Watson (Montgomery) performed an initial 48-hour SVE pilot test between Buildings 1/36 to estimate the vacuum radius of influence (ROI) and mass removal rates. In their report, *Conceptual Design of Final Soil and Groundwater Remediation System*, dated March 1994, Montgomery summarized the mass of contaminants recovered and the effective radii of influence (ROI). The results of the Montgomery report were:

- Approximately 74 lbs of total VOCs were reported recovered from one extraction well during a 48-hour testing period.
- An estimated average effective ROI of 55 feet (based on 6 data points and an unknown vacuum at the pumping well) was reported.

Montgomery described the ROI as the distance from an extraction well where at least 0.1 inches of water column vacuum may exist based upon observed data. This measure, however, does not describe the flow of air, and therefore the removal of mass from the porous soil matrix. Given the short-term test duration and lack of data points for system design, an extended duration pilot test was performed.

2.1.2 Extended Duration Pilot Test

In July, 2001, Haley & Aldrich installed 6 multi-depth SVE wells and implemented an extended pilot test in the Building 1 area using a 200-standard cubic feet per minute (scfm), 10-inches of mercury (in. Hg)-rated SVE system. The SVE pilot test equipment was operated under a various locations permit from the South Coast Air Quality Management District (SCAQMD). During the period of July 2 through September 28, 2001, the pilot test data indicate:

- Vapors were drawn from shallow wells (completed 15 to 40 feet below ground surface (bgs), and deep wells (completed 47 to 65 feet bgs).
- The SVE system operated for a total of approximately 61 days.
- The inlet vacuum ranged from 20 to 100 inches of water column.
- The pilot test flow rates ranged from 11.0 to 186.2 scfm.
- Inlet VOC concentrations ranged from 56 to 10,763 parts per million by volume (ppmV).

Based on the extended duration pilot test data and analytical evaluation discussed above, the following results and conclusions are provided:

- Based upon a linear regression of laboratory data, a calculated 1,324 lbs of total VOCs were recovered from the pilot test wells during the operational period, or approximately 1.6 to 203 lbs per day.
- Transient vacuum propagation curve fitting of data from selected shallow wells (8-30 feet bgs) and deep wells (40-65 feet bgs) yielded a dramatic drop in gradient and flow beyond 30 feet from the extraction wells, indicating an ROI of approximately 30 feet. Based on normalized data from field readings, the ROI for the shallow and deep wells was similar (within 4% difference).
- The calculated transmissivity in the shallow vadose zone is approximately one order of magnitude higher than the deep zone. This is likely due to vertical air leakage from the surface since the area is unpaved and recently re-graded.
- Granular activated carbon (GAC) adequately treats the waste stream and meets SCAQMD requirements.

Based on the above results, the following Building 1/36 SVE system design criteria were derived for the reduction of VOCs in soil:

- SVE wells should be located no further than 60 feet apart.
- Use a well field geometry that minimizes stagnation zones of air flow between wells in the deep zone.
- Wells should be screened in the shallow and deep soil horizons as necessary to maximize VOC removal.
- Design the extraction and treatment system to operate wells at an optimum flow rate range of 1 to 1.5 scfm per foot of well screen.
- Based on a goal of removing 500 air-filled pore volumes in approximately one year of operations, a total system airflow rate of 1,000 scfm provides economic and schedule advantages over smaller capacity systems.
- Use GAC for vapor emission control.

3.0 SVE SYSTEM DESCRIPTION

Based on the pilot test design criteria, the SVE system will conceptually consist of the following elements:

- Twenty shallow SVE wells (screened from 10 to 30 feet bgs)
- Twenty-three deep SVE wells (screened from 40 to 65 feet bgs)
- One 1,000-scfm vacuum blower system equipped with a vapor-liquid separator, discharge silencer, instrumentation, and flow controls
- An air to air heat exchanger
- Two 8,000 lb vapor phase GAC adsorption vessels
- 55-gallon drums for liquid collection as needed

Figure 2 illustrates the general layout of the SVE system. Preliminary specifications for components of the SVE blower system and GAC vessels are provided in Appendix A. Final specifications of the equipment to be used will be based on selection and availability of qualified equipment vendors.

Soil vapor from the extraction wells will be conveyed in above and below-ground piping to a vapor-liquid separator where entrained water will be removed prior to entering the blower (Figure 3). The soil vapor will then pass through the blower and be processed by an air-air heat exchanger to cool the vapor prior to treatment and improve GAC adsorption efficiency. The vapor stream will then be treated in the primary and secondary vapor-phase GAC adsorbers installed in series, then discharged via an exhaust stack. The system will be operated under a fixed-base SCAQMD Permit to Operate.

The SVE system will have a nominal capacity of 1,000 scfm at vacuums of up to 14 in. Hg. The SVE system will be equipped with a vapor-liquid separator to remove entrained liquids from the extracted vapor. The removed liquids will be transferred to a 55-gallon drum as generated. Water from the drums will be sampled and disposed at an approved facility. An air-air heat exchanger will be installed to cool the blower exhaust from approximately 190 deg. F to approximately 113 deg.F at 1,000 scfm to improve the GAC treatment efficiency. The SVE system will be equipped with the appropriate vacuum relief valves, safety shut-down controls, noise attenuation equipment, and system performance measurement gauges (Figure 3).

Vapor treatment will be provided by vapor-phase GAC absorbers, each containing approximately 8,000 pounds of GAC. The vessels will be rated to the maximum pressure of the SVE blower. Based on the pilot test data extrapolated to a flowrate of 1,000 scfm, initial carbon usage is estimated to be approximately 4,000 to 6,000 pounds per day, and is expected

to drop to approximately 200 to 300 pounds per day after 20 days. This would further be attenuated with dilution air blending in accordance with SCAQMD permit conditions.

4.0 SVE SYSTEM CONSTRUCTION

4.1 WELL INSTALLATION

The SVE system wells will be dual-completed in a single borehole to accommodate two primary geologic horizons of the vadose zone as discussed above. A total of twenty shallow and twenty-three deep-screened wells will be installed for the system. The shallow well completions will be 3-inch inner diameter (ID) polyvinyl chloride (PVC) well casing and screen with a 0.020-inch slot screened from approximately 10 to 30 feet bgs. The deep well completions will be constructed from 3-inch ID PVC casing and screen with a 0.020-inch slot screened from approximately 40 to 65 feet bgs. The screened intervals may be adjusted in the field based on local lithology and field screening for VOCs, with the screens being placed to intersect the most highly VOC-impacted zones. The screened intervals will be packed with #3 sand, bentonite seals will be placed from approximately 6 inches above the lower screened interval to approximately 6 inches below the upper-screened interval, a 2-foot thick hydrated bentonite chip seal will be placed above the gravel pack. This seal will be placed and hydrated in 6-inch lifts. A high-solids bentonite grout will be placed from this seal to approximately 3 feet bgs. The remaining annular space will be backfilled with drill cuttings until the well casings are connected to the SVE system with a wellhead installation. Wells 1-VEW-1 through 1-VEW-3, 1-VEW-8A, and 1-VEW-15A through 1-VEW-20A will be installed in Parcel A (currently an inactive AutoNation facility) and will be completed below grade with traffic-rated steel vaults for security and vehicle access within the property. The location of the proposed wellfield is shown on Figure 2. A well construction detail is included on Figure 4.

4.2 PIPING

The field piping will consist of a combination of 6-inch and 4-inch-diameter, schedule 40 PVC. Piping from the treatment wells will be routed to PVC header pipes located in the treatment compound (Figure 2). Each extraction well will be equipped with ball or gate valves to regulate flow, a labcock sample valve, and a threaded port for flowrate instrumentation. The main header pipe leading to the vapor extraction equipment will be equipped with a labcock sample valve and flow-sensing device for SCAQMD permit compliance monitoring. Piping to wells 1-VEW-1 through 1-VEW-3, 1-VEW-8A, and 1-VEW-15A through 1-VEW-20A will be installed below grade in Parcel A for security and to maintain vehicle access. Piping to the remaining wells in Parcel C will be above grade pending site development as indicated in Figure 2.

4.3 SVE EQUIPMENT COUMPOUND

To accommodate the skid-mounted SVE unit, a 6-inch thick course of aggregate will be placed in an approximately 30 by 30-foot area in the northeast corner of the site near the former Building 36 (Figure 2). The aggregate will be compacted to provide a stable, level surface. The SVE equipment will be enclosed by an 8-foot-high chain-link fence with 3-strand barbed wire. The fence will have a swing gate for access.

4.4 ELECTRICAL SERVICE

Electrical service (likely a temporary construction power pole) will be installed near the treatment compound. Electrical power connection will be made to the treatment equipment in accordance with local building codes pertaining to construction jobsite service and manufacturer specifications.

5.0 SVE OPERATION AND MAINTENANCE

For the duration of the SVE system operation, weekly operation and maintenance of the equipment will be performed to ensure that SCAQMD permit compliance is met, operation parameters are recorded and optimized, and maximum mass removal is maintained. Performance data will be collected from each of the extraction wells to maximize system performance. If monitoring from selected wells indicate low VOC removal rates, they may be removed from system operation.

5.1 MONITORING AND SAMPLING

During start-up, monitoring will occur at the SCAQMD-stipulated intervals (typically every 8 hours for the first 48 hours, daily for the first two weeks, and weekly thereafter). Data collected during system operation will include power readings, influent vapor velocity, vacuum, temperature, and inlet/outlet VOC concentrations. VOC concentrations will be measured using a dedicated FID or PID. These measurements will be supplemented with a monthly Tedlar bag or Summa canister influent and effluent samples to verify field measurements and calculate mass removal rates. Air samples will be analyzed for VOCs by EPA Method TO14. Field readings and observations will be recorded on field data log sheets. Any other operational requirements stipulated by the SCAQMD will be added to the SVE monitoring program.

5.2 TIMEFRAME

The SVE system will be operated subsequent to approval of the Workplan by the LARWQCB. The SVE system will operate until VOC concentrations are reduced to asymptotic levels where continued operation no longer provides VOC removal benefit. Based on analytic calculations, it is anticipated that an asymptotic concentration that experiences minimal vapor concentration rebound will be achieved through the removal of 500 to 1,000 pore volumes of air. At a flow rate of approximately 1.5 scfm per foot of well screen, removal of this pore volume is expected to take from approximately 8 to 16 months using a 1,000 scfm-rated SVE system.

6.0 PERMITTING

A SCAQMD fixed-base system Authority to Construct/Permit to Operate (ATC/PTO) application will be filed for the SVE system operation. The proposed vapor extraction wells are within the vadose zone; therefore, permits from the Los Angeles County Department of Health for installation are not required.

Electrical connection of the SVE unit to the temporary power pole will be established as temporary construction site service, therefore Department of Water and Power and City of Los Angeles inspections may be required, but no formal electrical permitting is anticipated.

7.0 HEALTH AND SAFETY

The site-specific Health and Safety Plan (HASP) prepared by Haley & Aldrich for worker safety will be amended prior to system installation and operation to include construction oversight, and operation and maintenance of the treatment system.

8.0 UNDERGROUND UTILITIES

Underground utilities within Parcel C in the Building 1/36 area have reportedly been removed as part of site demolition. Installation of new utilities within the pilot test area will be identified and coordinated with the site developer, if necessary.

9.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

All site personnel will be equipped, at a minimum, with Level D safety gear (e.g. hard hat, steel-toed boots, and traffic vest). Because dust may be a problem and chlorinated hydrocarbons and moderate concentrations of metals are known to exist in site soils, workers

should monitor ambient dust levels using Occupational Safety and Health Administration (OSHA)-approved dust monitoring equipment. If dust levels exceed HASP requirements, dust control and/or proper PPE such as respirators should be used. HASP requirements will be implemented during system operation.

10.0 REPORTING

Quarterly reports will be prepared describing system operation, monitoring activities, and system performance for the LARWQCB. The system reports will include VOC monitoring data, system flow rates, system up-time, and pounds of VOC removed. Graphs of VOC concentration and pounds of VOC removed over time will also be provided. Other measurements taken in the field will also be presented in tabular format.

This opportunity to be of service is appreciated. If you have any questions, please do not hesitate to contact the undersigned.

Sincerely yours,
HALEY & ALDRICH, INC.

Richard M. Farson, P.E.
Senior Engineer

Scott P. Zachary
Vice President

Attachments: Figure 1 – Site Plan
Figure 2 – SVE Layout
Figure 3 – Equipment Schematic
Figure 4 – Well Detail
Appendix A – Vendor Data

References:

Kennedy/Jenks. 1996. Phase I Environmental Assessment, Douglas Aircraft C-6 Facility, Parcel C. May.

Kennedy/Jenks. 2000a. Areas 4 and 5 - Phase II Soil Characterization, McDonnell Douglas Realty Company, C-6 Facility, Los Angeles, CA, Volume I. August.

Kennedy/Jenks. 2000b. Groundwater Monitoring Report, 2nd Quarter 2000, Boeing Realty Corporation's C-6 Facility, Los Angeles, CA. July.

Montgomery Watson. 1994. Conceptual Design of Final Soil and Groundwater Remediation System at the Douglas Aircraft Company. March.

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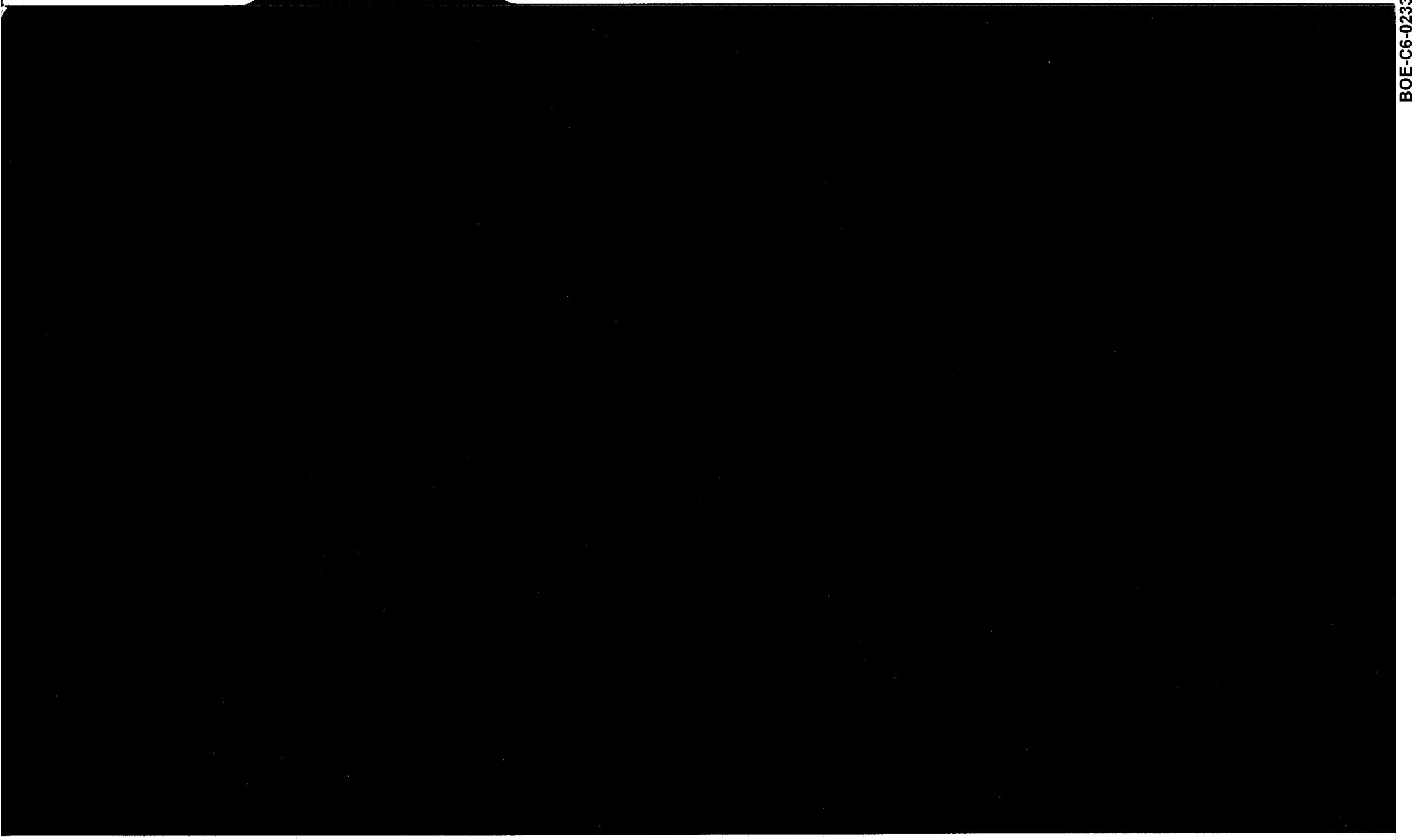

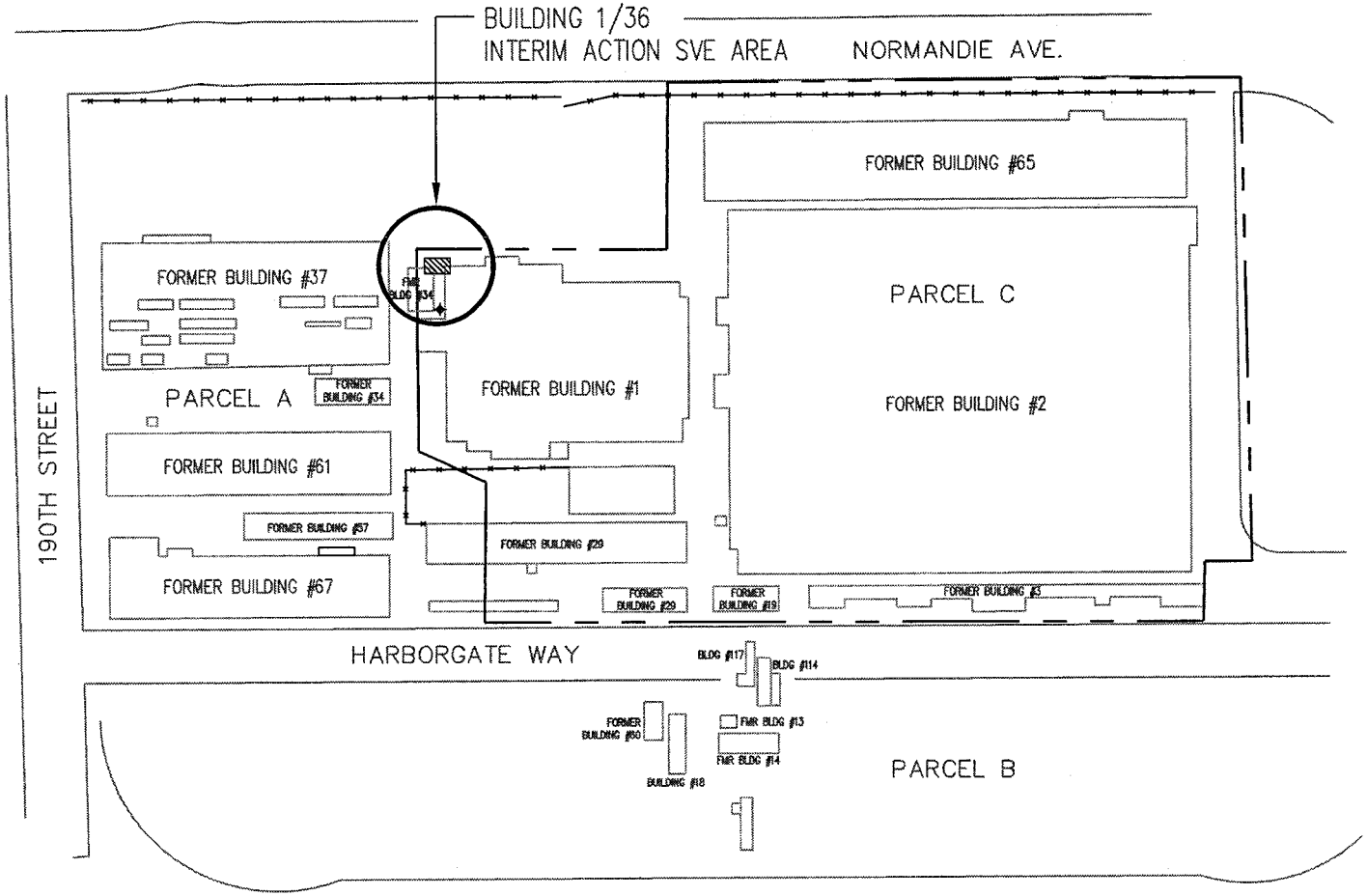

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UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

BOEING REALTY CORPORATION
FORMER C-6 FACILTY
LOS ANGELES, CALIFORNIA

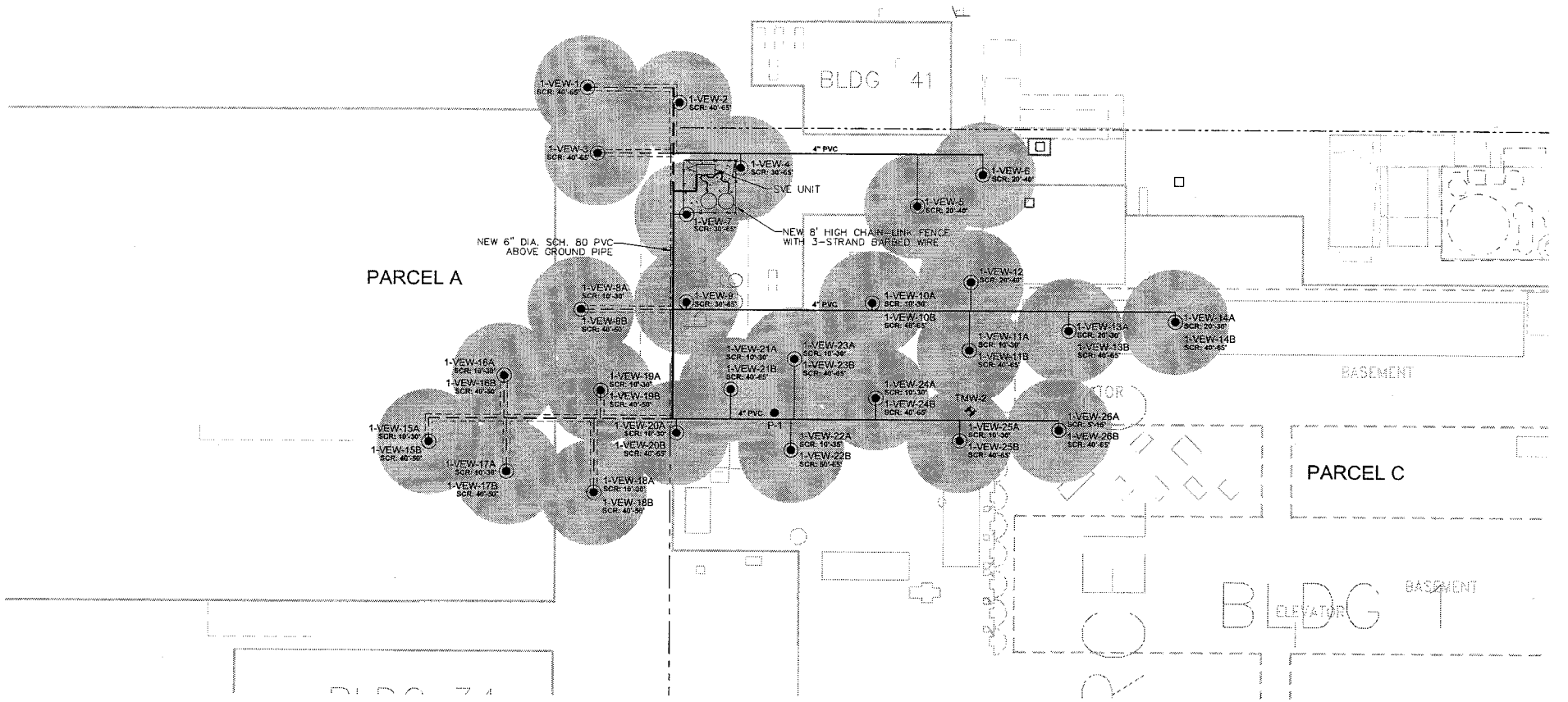
FIGURE: 1

BUILDING 1/36 AREA INTERIM ACTION SVE WORK PLAN SITE PLAN

SCALE: AS SHOWN | PROJECT: 27960-001
DRAWN: SAL | REVIEWED: RMF | DATE: 17 OCT, 2001

G:\PROJECTS\ENVIRONMENTAL\BOEING\C-6\AUTOCAD\BUILDING 1-36 SVE\FIGURE 1

BOE-C6-023500



DRAFT

LEGEND

- PROPOSED SVE WELL
- SCR:20'-50' SCREENED INTERVAL
- ABOVE GROUND PIPING
- UNDERGROUND PIPING
- APPROXIMATE RADIUS OF INFLUENCE

N

0 15 30 60
FEET

NOTE: ALL DIMENSIONS AND LOCATIONS APPROXIMATE

G:\PROJECTS\ENVIRONMENTAL\BOEING\C-6\AUTOCAD\BUILDING 1-36 SVE\FIGURE 2

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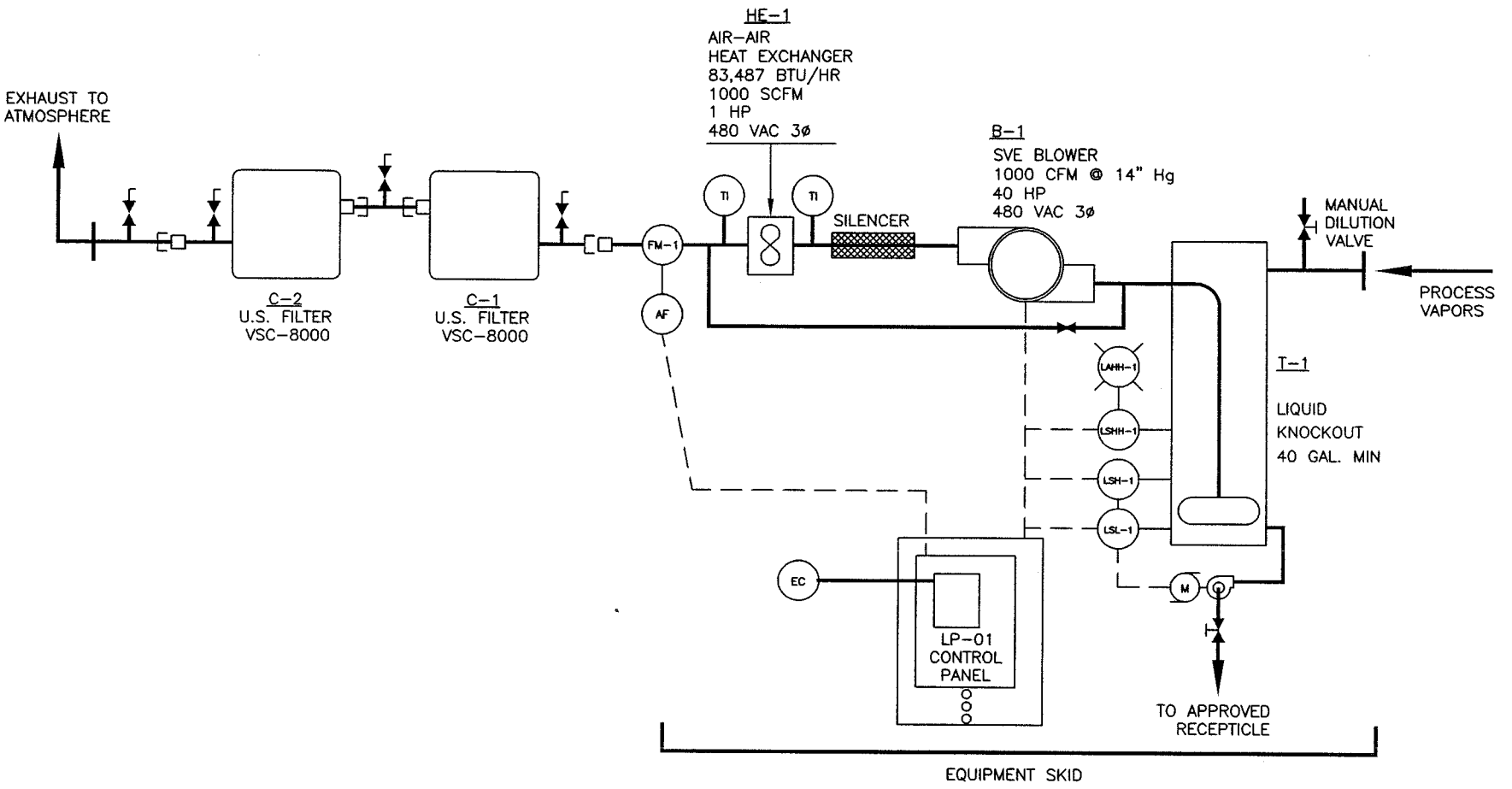
BOEING REALTY CORPORATION
FORMER C-6 FACILITY
LOS ANGELES, CALIFORNIA

FIGURE: 2

BUILDING 1/36 INTERIM ACTION SVE LAYOUT

SCALE: AS SHOWN | PROJECT: 27960-001
DRAWN: SAL | REVIEWED: RMF | DATE: 17 OCT. 2001



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UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

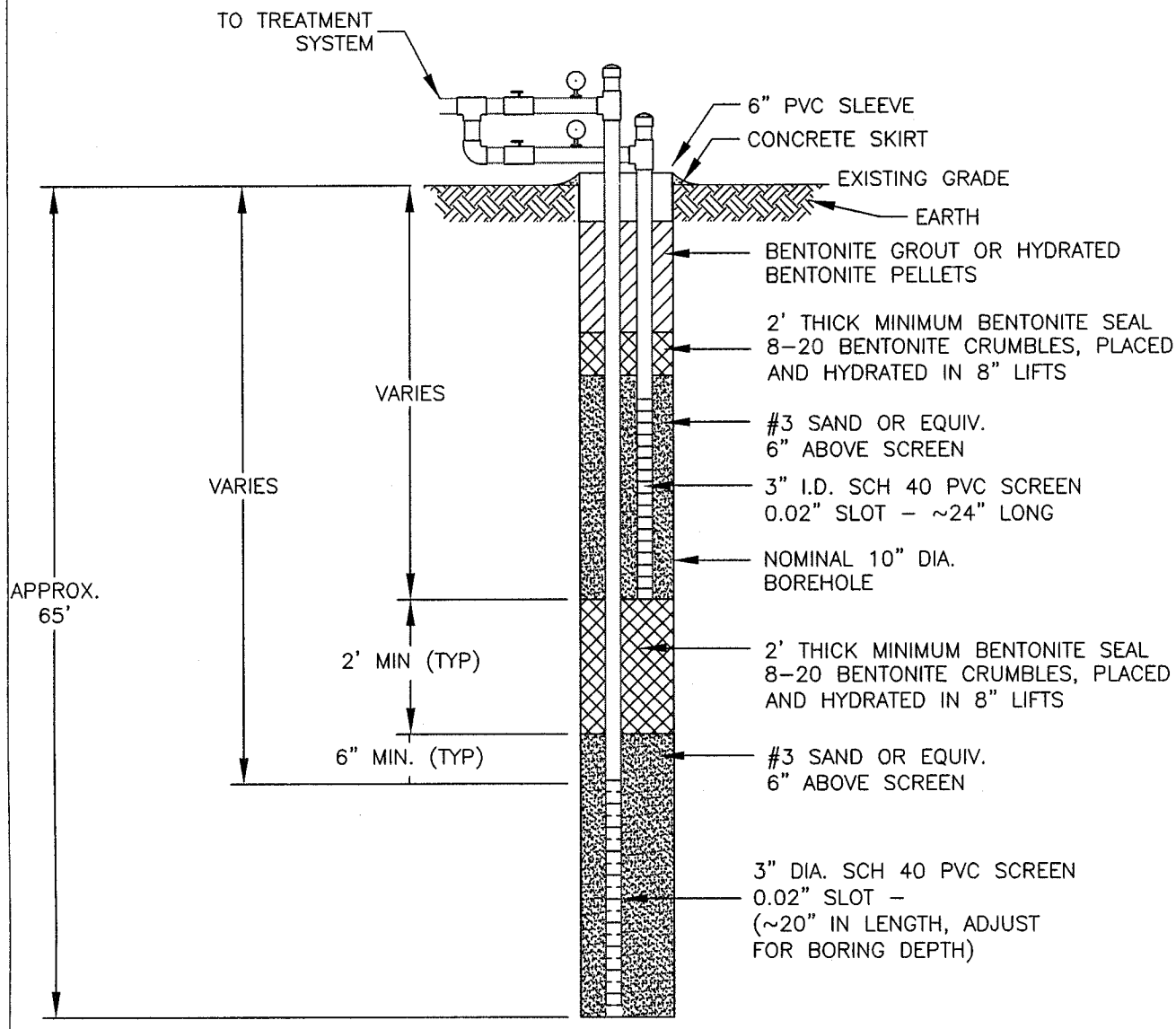
BOEING REALTY CORPORATION
FORMER C-6 FACILTY
LOS ANGELES, CALIFORNIA

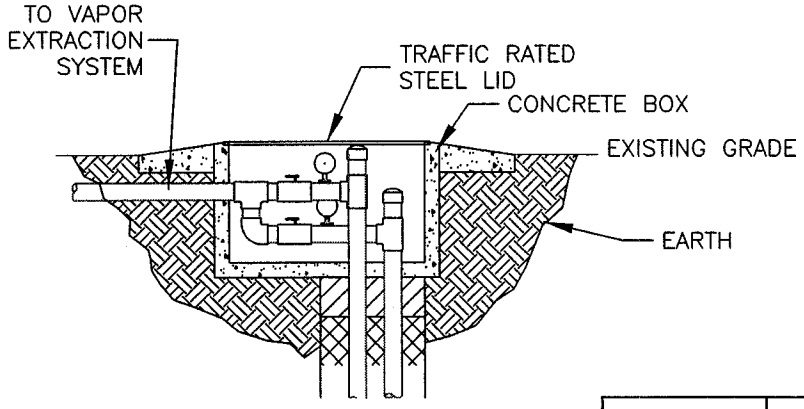
FIGURE: 3

BUILDING 1/36 AREA INTERIM ACTION SVE WORK PLAN EQUIPMENT SCHEMATIC

SCALE: AS SHOWN		PROJECT: 27960-001
DRAWN: SAL	REVIEWED: RMF	DATE: 17 OCT, 2001

G:\PROJECTS\ENVIRONMENTAL\BOEING\C-6\AUTOCAD\BUILDING 1-36 SVE\FIGURE 3





DETAIL A
UNDERGROUND WELLHEAD

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FIGURE: 4

BUILDING 1/36 AREA
INTERIM ACTION SVE WORK PLAN
SOIL VAPOR EXTRACTION WELL DETAIL

SCALE: NTS | PROJECT: 27960-001
DRAWN: SAL | REVIEWED: RMF | DATE: 17 OCT, 2001

G:\PROJECTS\ENVIRONMENTAL\BOEING\C-6\AUTOCAD\BUILDING 1-36 SVE\FIGURE 4

Appendix A

[redacted]

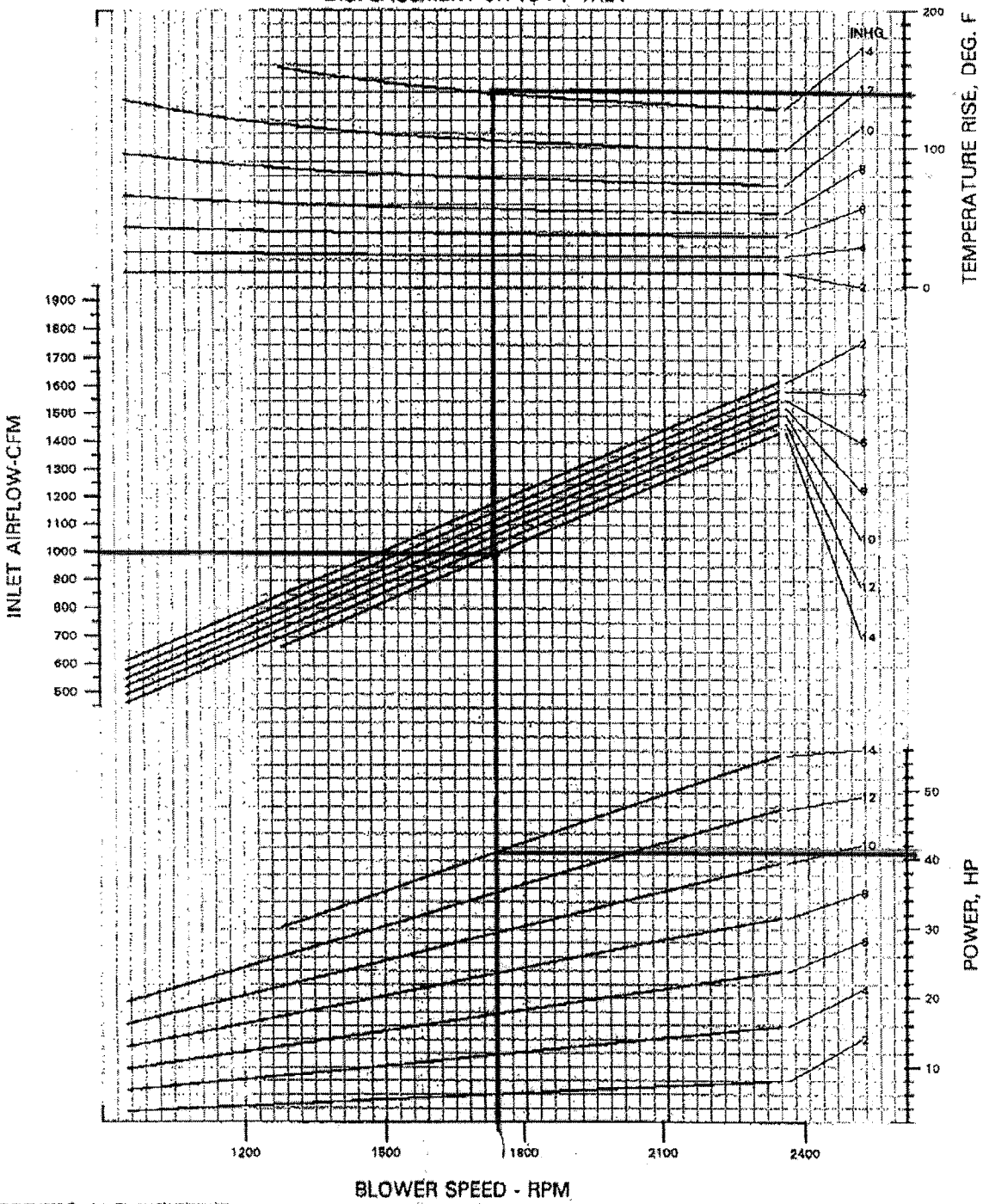
Gardner Denver

SUTORBILT LEGEND™
MODEL 6L
P-VERSION

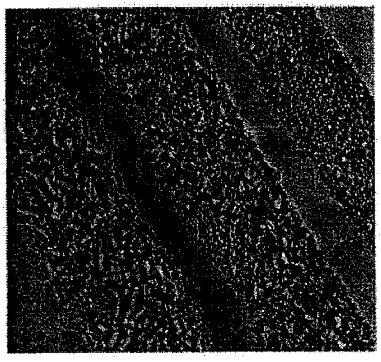
DATA SHEET: SB-2-360P
DATED: 4-3-95

VACUUM PERFORMANCE CURVE

INLET AIR AT 68 DEG F, SPECIFIC GRAVITY = 1.0, DISCHARGE AT 29.92 IN HG ABS
DISPLACEMENT 0.718 FT³/REV



VOCarb™ AIR TREATMENT CARBONS



Size, shape, pore structure... each VOCarb product is engineered for specific applications.

Applications:

Cost-effective VOCarb™ activated carbons developed by U.S. Filter/Westates have demonstrated superior performance on an extensive range of air treatment applications. Manufactured from coconut shells, anthracite and bituminous coal, VOCarb™ carbons are available for:

- Chemical process applications
- VOC control from air strippers, soil vapor extraction and air sparge systems
- Tank vent emissions
- Solvent recovery
- HVAC
- Odor Control

Benefits and Features:

- Superior adsorption and VOC retention characteristics.
- Reactivation services.
- Carbon adsorption system design support.
- Unexcelled quality control and quality assurance programs.
- VOCarb™ activated carbons are suitable for multiple cycles of regeneration and high temperature reactivation, which allow for the reuse of the carbon and eliminates disposal issues.

Quality Control/Assurance

U.S. Filter/Westates in Los Angeles operates a full capabilities carbon testing laboratory that uses ASTM standard test procedures to assure carbon quality. A detailed quality assurance program guarantees consistent quality from lot to lot and shipment to shipment.

U.S. FILTER
WESTATES

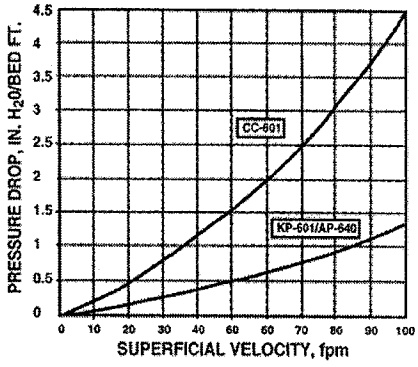
VOCarb™ AIR TREATMENT CARBONS

VOCarb™ Activated Carbons for Air Treatment Applications

Specifications	CC-601	KP-601	AP-640
Carbon Type	Coconut	Bit.Coal	Anthracite
Mesh Size, U.S. Sieve	4x8	4x6	4x6
Shape	Granular	Pellet	Pellet
Butane Number, wt.% (min.)[1]	23.5	23.5	23.5
Hardness No., wt.% (min.)	97	93	95
Moisture, wt.% (max as packed)	3	3	3
Ash, wt.% (max.)	6	12	8
Typical Properties			
CTC Activity, wt.% (typ.)	65	65	65
CTC Retentivity, wt.% (min.)	>35	22 - 25	25 - 30
Mean Particle Diameter, mm	3.4	4.0	4.0
Surface Area (B.E.T. - m^2/g)	1250	1050	1050
Apparent Density, lb/ft^3	29 - 31	26	30

[1] Butane activity (D5742) has been adopted by ASTM as a replacement for CTC activity (D3467).

Pressure Drop Characteristics



Technical Support

The proper design of an activated carbon adsorption system is dependent on the VOC type, influent concentration, temperature, superficial velocity, relative humidity and other factors. An extensive isotherm database and computer modeling programs aid in carbon selection, usage rate calculations and adsorber sizing.

VOCarb™ CC - 601

A high surface area, high activity coconut shell activated carbon. CC-601shows very high VOC adsorption capacity and retentivity. The granular shape allows for lower void fraction and more efficient contact with the gas stream. Excellent hardness means minimal fines generation during loading, use and service.

VOCarb™ AP - 640

A 4mm pelletized carbon manufactured from a high grade metallurgical coal (anthracite). Its high surface area, VOC adsorption capacity, retentivity and low inorganic ash content make AP-640 an ideal general purpose carbon for gas phase adsorption applications. Its pellet shape allows for low pressure drop characteristics.

VOCarb™ KP - 601

A 4mm pelletized bituminous coal based carbon. KP-601 shows high adsorption capacity and excellent low pressure drop characteristics. Manufactured using a unique binder system that enhances VOC release from the carbon surface. Ideal for solvent recovery systems with on-site steam or hot gas regeneration. Excellent carbon for chemical impregnation.

Safety Note: Under certain conditions, some chemical compounds may oxidize, decompose, or polymerize in the presence of activated carbon. This could result in temperature increases sufficient to cause ignition. Therefore, particular care must be taken with compounds having peroxide-forming tendencies.

U.S.FILTER
WESTATES

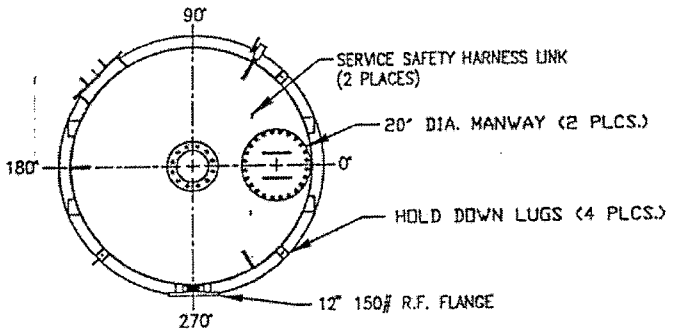
U.S.Filter/Westates
Baytown, TX 800-659-1723
Warren, NJ 800-659-1717
Los Angeles, CA 800-659-1771
Oakland, CA 800-659-1718

CERTIFIED FOR CONSTRUCTION

APR 20 98

WESTATES CARBON, INC.

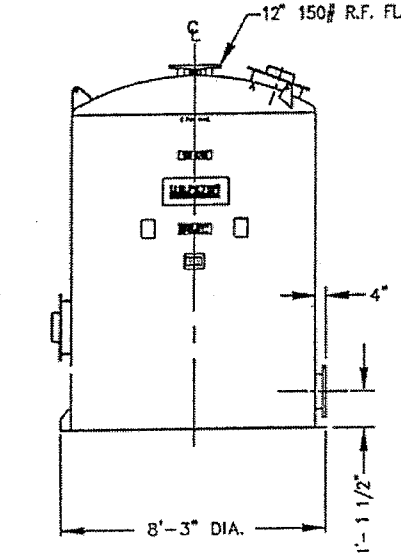
DWG: A11118GA



PLAN VIEW

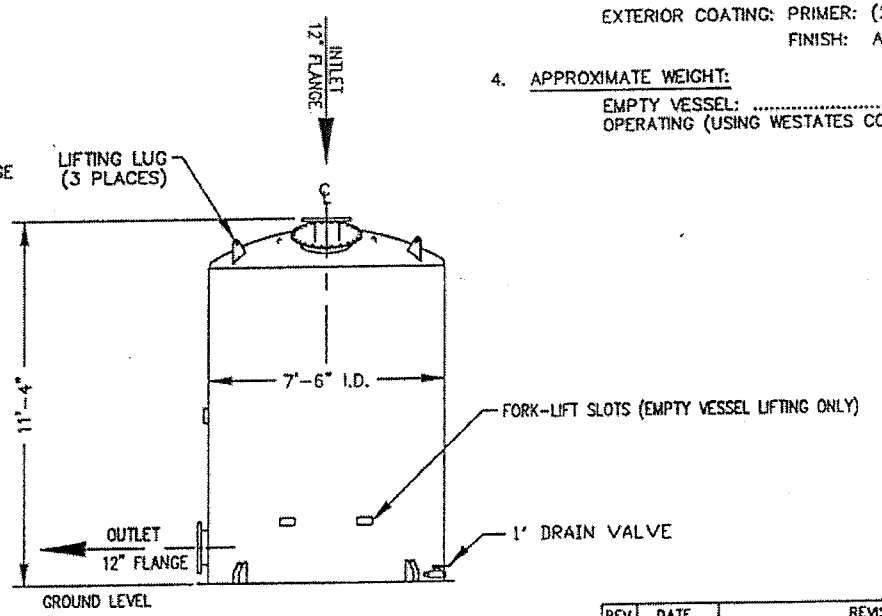
NOTES:

1. DESIGN DATA:
   90" DIAMETER PRESSURE VESSEL – 5 PSIG (MAX.)
   @ 120°F – NOT ASME CODE STAMPED
   FOR VAPOR USE ONLY, MAX. FLOW = 3,000 CFM
   286 CU. FT. ACTIVATED CARBON
2. MATERIAL:
   CARBON STEEL
3. SURFACE PREPARATION:
   INTERIOR COATING: FUSION BONDED EPOXY
   EXTERIOR COATING: PRIMER: (2) PART EPOXY PRIMER
   FINISH: ALIPHATIC POLYURETHANE FINISH, WHITE
4. APPROXIMATE WEIGHT:
   EMPTY VESSEL: ..... 4,400 LBS
   OPERATING (USING WESTATES CC601 CARBON): .... 12,400 LBS



ELEVATION VIEW

(SEE PLAN VIEW FOR CORRECT UNIT ORIENTATION)



SIDE VIEW

REV.	DATE	REVISION DESCRIPTION	DRAWN	CHK'D	ENG'R

CUSTOMER: U.S. FILTER WESTATES

LOCATION:

PLOT SCALE: 1/4"=1'-0"

DO NOT SCALE DRAWING

PROJECT No. STANDARD

DRAWN: D.J.B. 05/02/94

CHK'D:

U.S. FILTER WESTATES

1606 Executive Dr.
LaGrange, Ga. 30240

TITLE:

VSC-8000-12
(VENT SCRUB ADSORBER)
GENERAL ARRANGEMENT

DATE: 05/11/94

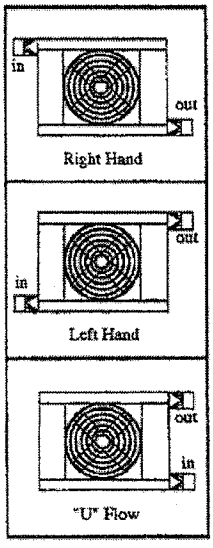
REF. ENG.

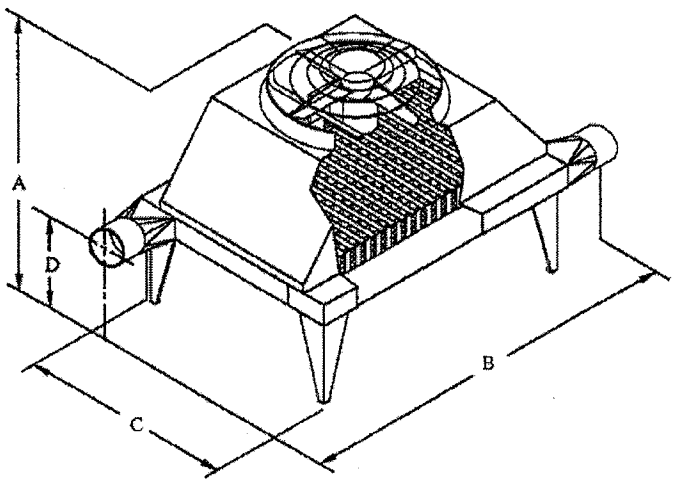
BOE-C6-0233508

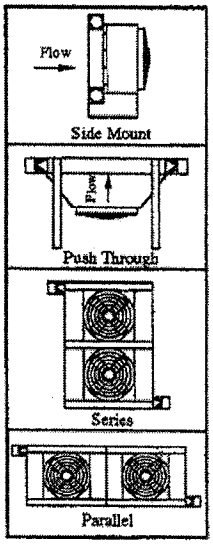
Xchanger, Inc.

AA Series Heat Exchanger

AA Series exchangers cool low pressure air streams using fan-drafted ambient air. Air flows to 3,500 CFM from vacuum to 75 PSI can be cooled near ambient, with under 0.2 PSI pressure loss. AA Series exchangers are ideal for installation outdoors where cooling water is unavailable or undesirable due to freezing temperatures. Indoor installations should be well ventilated. The process air should be filtered and pulsating flow, such as that produced by rotary lobe blowers, should be dampened by a chambered silencer prior to entering the heat exchanger.







See line #54 of data sheet for approximate dimensions

Std. Lead Time: 6 Weeks

Expedited Shipping Schedule (If Available)	
Working Days *	AA Series & Cores
5	20%
10	10%
15	5%
20	2.5%
30	---

* After Drawing Approval

Add 5 days to schedule for epoxy phenolic coating.

Design Options:

Connection types: tube, pipe, flange, NPT, ferrule, etc
Materials of construction:
Core: aluminum (others available with our LC series)
Propeller, venturi and shroud: painted or galvanized steel, aluminum, stainless steel
Motors: any available
Epoxy phenolic coating for corrosion protection of the core
Units can be built to required dimensions
Multiple cores combined together to make a single unit

Accessories: (Prices Subject To Change)

Instrument Coupling:	$ 55
Thermometer: (In Coupling)	$ 88
Differential Pressure Gauge:	$ 280
Temperature Controller: (with var. freq. drive)	$ 2,500-3,500
Service side filters	Ask
Others available upon request	

XI3F01

1401 S. 7th St • Hopkins, MN 55343 • Ph:952.933.2559 • Fax:952.933.5647• www.xchanger.com

We also offer water cooled exchangers

Xchanger, Inc.	**Rating for Model AA-1000 ref #62203**		**Page 1 of 1**
Engineer: Paul Boedecker			October 3, 2001
Prepared for:			
	Hailey & Aldrich		
	Richard Farson		
	PH: 619/280-9210, FAX: 619/280-9415		
PERFORMANCE	**PROCESS MEDIA SIDE**		**SERVICE MEDIA SIDE**
Fluid Circulated	Air		Air
Volumetric Flow Rate	1,000.0 Std. ft^3/min		3,759.7 Std. ft^3/min
Total Fluid Entering	4,500.0 lb/hr		16,918.7 lb/hr
Liquid			
Vapor			
Non-Condensibles	4,500.0 lb/hr		16,918.7 lb/hr
Vaporized or (Cond.)			
Temperature In	190.0 °F		100.0 °F
Temperature Out	112.7 °F		120.6 °F
Inlet Pressure (Absolute)	15.696 lb/in²		14.696 lb/in²
Velocity (Standard)	2,723.2 ft/min		888.1 ft/min
Pressure Loss	8.1 in. water		0.4 in. water
Fouling Factor	0.00010 ft²-°F-hr/BTU		0.00010 ft²-°F-hr/BTU
Total Heat Exchanged: 83,487 BTU/hr			
AVERAGE MEDIA PROPERTIES			
Thermal Conductivity	0.01673 BTU/hr-ft-°F		0.01579 BTU/hr-ft-°F
Specific Heat	0.23993 BTU/lb-°F		0.23964 BTU/lb-°F
Viscosity	0.04926 lb/ft-hr		0.04676 lb/ft-hr
Density	0.06945 lb/ft^3		0.06970 lb/ft^3
Latent Heat of Vapor			
CONSTRUCTION			
Design Temperature	200.0 °F		Not Applicable
Design Pressure (Gauge)	40.0 lb/in²		Not Applicable
Test Pressure (Gauge)	40.0 lb/in²		Not Applicable
Cyclic Pressure	No		Not Applicable
Flow Direction	Right Hand Horizontal		Vertical Up
Coating	None		None
Plate-Fin Core : Aluminum		Exhaust Hood : Galvanized Steel	
Fan Guard : Coated Carbon Steel		Venturi Frame : Coated Carbon Steel	
Drawing Number :		Weight : 250.0 lb	
CONNECTIONS			
Process Inlet : 6 inch dia. tube stub			
Process Outlet : 6 inch dia. tube stub			
Instrument :			
MECHANICAL EQUIPMENT			
Fan Diameter : 24 inch		Motor : 1.00 HP TEFC	
Fan Qty/Speed : 1 / 1725 RPM		Motor Qty/Speed : 1 / 1725 RPM	
Fan Type : 4 Blade Carbon steel		Motor Electrical: 208-230/460/3/60	
NOTES			
Approximate unit dimensions (inches): A = 35, B = 66, C = 36, D = 16			
Construction material suitability must be determined by customer.			
The process flow must be uniform, smooth and free of pulsation.			
This unit is not designed for cycling process gas pressure.			